

What is claimed is:

1. A lighting arrangement for illuminating an object to be observed by a vision system,  
comprising:
  - 5 a light source for generating a predetermined light output in response to a light control  
signal;
  - a housing positionable in optical proximity to the object, the light source disposed in the  
housing such that the light illuminates the object during observation by the vision system; and
  - a light controller in electrical communication with the light source for supplying the light  
10 control signal, the light controller including an input for receiving from the vision system a  
command specifying the predetermined light output.
2. The lighting arrangement of claim 1, wherein the light source includes a plurality of  
lighting elements each disposed in a corresponding one of a plurality of locations in the housing.  
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3. The lighting arrangement of claim 2, wherein at least some of the lighting elements are  
light-emitting diodes.
4. The lighting arrangement of claim 3, wherein the predetermined light output includes a  
20 hue, and at least some of the light-emitting diodes emit light of essentially the same hue.

5. The lighting arrangement of claim 3, wherein the predetermined light output includes a hue, and at least some of the light-emitting diodes emit light of a different hue from at least some others of the light-emitting diodes.

5           6. The lighting arrangement of claim 5, wherein the intensity of light emitted from the at least some light-emitting diodes is independent of the intensity of light emitted from the at least some other light-emitting diodes in order to vary the hue of the light output.

7. The lighting arrangement of claim 3, wherein at least some individual ones of the light-emitting diodes emit light of a variable hue.

8. The lighting arrangement of claim 3, wherein the intensity of light emitted by each light-emitting diode is controlled by pulse width modulation.

15           9. The lighting arrangement of claim 3, wherein the housing is a toroid having at least one light-transmitting planar surface, and wherein the light emitting diodes are disposed around the toroid so as to evenly illuminate the object with light transmitted through the light-transmitting planar surface.

20           10. The lighting arrangement of claim 9, wherein the light-transmitting planar surface further includes a diffuser mounted between the light emitting diodes and the object.

11. The lighting arrangement of claim 3, wherein at least some of the light-emitting diodes emit light of a different intensity from at least some others of the light-emitting diodes.

12. The lighting arrangement of claim 11, wherein the intensity of light emitted from the  
5 at least some light-emitting diodes is independent of the intensity of light emitted from the at least some other light-emitting diodes so as to vary the directionality of the illumination on the object.

13. A lighting arrangement for providing a predetermined illumination on an object illuminated by a varying ambient light, comprising:  
10 a light source disposed in optical proximity to the object for illuminating the object with a supplied light of a certain intensity in response to a light control signal;  
an illumination sensor disposed in optical proximity to the object for detecting the total illumination resulting from both the supplied light and the ambient light, the illumination sensor producing an illumination signal proportional to the total illumination; and  
15 a light controller electrically connected to the illumination sensor and the light source, the light controller having a negative feedback circuit for producing the light control signal in response to the illumination signal so as to maintain the predetermined illumination on the object.

14. The lighting arrangement of claim 13, further including specifying means for  
20 specifying the predetermined illumination.

15. The lighting arrangement of claim 14, wherein the specifying means is at least one manually operable control electrically connected to the feedback circuit.

16. The lighting arrangement of claim 14, wherein the specifying means is a  
5 programming interface electrically connected to the light controller.

17. The lighting arrangement of claim 14, further comprising:  
a housing for mounting the light source and the light sensor, wherein the light sensor is a reflective sensor.

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18. A method for illuminating an object with a predetermined illumination, comprising:  
specifying the predetermined illumination;  
applying light of an initial intensity level derived from the predetermined illumination to  
the object;

15 sensing a total illumination on the object resulting from applying the initial intensity level  
light;

determining a corrected intensity level from the initial intensity level and the total  
illumination; and

reapplying light of the corrected intensity level so as to illuminate the object with the  
20 predetermined illumination.

19. The method of claim 18, wherein the sensing includes sensing an ambient light illumination on the object.

20. The method of claim 19, wherein the sensing, determining, and reapplying are  
5 repeated at a certain interval so as to maintain the predetermined illumination regardless of fluctuations in the ambient light illumination.